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JCG21 U.S. PTO
09/689017
10/12/00

Docket Number F-152
Pitney Bowes Inc.
35 Waterview Drive
P.O. Box 3000
Shelton, CT 06484-8000
October 12, 2000

BOX PATENT APPLICATION
ASSISTANT COMMISSIONER FOR PATENTS
WASHINGTON, D.C. 20231

Sir:

Transmitted herewith for filing is the patent application of

Inventor: James A. Salomon

For: **METHOD AND SYSTEM FOR PRODUCING ROBUST INDICIA FOR DIGITAL PRINTING AND
VERIFICATION**

Enclosed are:

13 pages comprising the specification, claims, and abstract.

4 sheets of drawing.

A Declaration and Power of Attorney.

A Recordation of Assignment Request and a copy of the executed Assignment of the invention to
Pitney Bowes Incorporated, 1 Elmcroft Road, Stamford, Connecticut 06926-0700.

Express Mail Certificate.

Return Receipt Postcard.

Fees calculated as follows:

Basic Fee						\$ 710.00
Claims Fee	Number Filed		Number Extra	Rate		
Total Claims	15	- 20 =	0	X \$18.00	=	\$ 0.00
Independent Claims	2	- 3 =	0	X \$80.00	=	\$ 0.00
Multiple Dependent Claims				\$260.00	=	\$
				Total Filing Fee		\$ 710.00

Please charge our Deposit Account Number **16-1885** in the amount of \$ 710.00 for the filing fee.

The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Account Number **16-1885**.

A copy of this Transmittal Letter is enclosed for use in charging the Deposit Account.

Ronald Reichman
Ronald Reichman
Reg. No. 26,796
Attorney of Record
Telephone (203) 924-3854

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of)

James A. Salomon) Attorney Docket No.: F-152

Serial No.:) Date: October 12, 2000

Filed: Concurrently herewith)

Title: **METHOD AND SYSTEM FOR PRODUCING ROBUST INDICIA FOR DIGITAL
PRINTING AND VERIFICATION**

JC921 U.S. PRO
09/689017
10/12/00



RECORDATION OF ASSIGNMENT - NEW PATENT APPLICATION

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

Please record the attached original document(s) or copy(ies) in the records of the U.S. Patent and Trademark Office.

1. Name of conveying party: James A. Salomon	2. Name of receiving party: Pitney Bowes Inc. One Elmcroft Road Stamford, CT 06926-0700
3. Nature of Conveyance: Assignment Execution Date: October 11, 2000	
4. Property Conveyed: This document is being filed together with a new patent application. The execution date of the application is October 11, 2000.	
5. Name and address of party to whom correspondence concerning this document should be mailed: Ronald Reichman Pitney Bowes Inc. 35 Waterview Drive P.O. Box 3000 Shelton, CT 06484-8000	6. Total Number of Applications: 1 7. Total Recordal Fee: \$40.00 8. Charge the \$40.00 Fee to Deposit Account No. 16-1885.

9. Statement and Signature

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Ronald Reichman
Ronald Reichman

October 12, 2000

Total number of pages including this cover sheet: 3

ASSIGNMENT

WHEREAS, I, James A. Salomon, have invented certain new and useful improvements in a **METHOD AND SYSTEM FOR PRODUCING ROBUST INDICIA FOR DIGITAL PRINTING AND VERIFICATION** identified as File Number **F-152** in the Intellectual Property and Technology Law Department files of the hereinafter-mentioned assignee, and have executed an application for United States Patent based thereon on the 11/14 day of October, 2000;

AND WHEREAS, Pitney Bowes Inc., a corporation organized and existing under the laws of the State of Delaware and having its place of business at 1 Elmcroft Road, Stamford, Connecticut, U.S.A., is desirous of acquiring certain rights thereunder.

NOW, THEREFORE, for one dollar and other good and valuable consideration, receipt of all of which is hereby acknowledged, I have agreed to and hereby sell, assign and transfer unto said corporation the entire right, title and interest, in and throughout the United States of America (including its territories and dependencies) and all countries foreign thereto, in and to said invention, said application and any and all patents (including extensions thereof, and all the rights under the International Convention for the Protection of Industrial Property including the right to claim for any foreign patent application the priority date of the corresponding U.S. patent application) of any country, which have been or may be granted on said invention or any part thereof, or on said application or any divisional, continuing, renewal, substitute, reissue or other patent application based in whole or in part thereon, or based upon said invention;

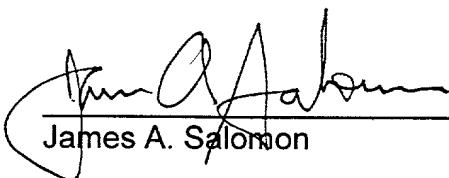
TO BE HELD AND ENJOYED by said corporation, its successors and assigns, to the full ends of the respective terms of which said patents or any of them have been or may be granted, as fully and entirely as the same would have been held and enjoyed by me had no sale and assignment of said interest been made;

AND I do hereby authorize and request the Commissioner of Patents and Trademarks of the United States of America to issue any and all United States patents which may be granted upon said United States application or any of them, or upon said invention or any part thereof, to said corporation;

AND I hereby agree for myself and for my heirs, executors and administrators, to execute without further consideration any further lawful documents and any further assurances, and any divisional, continuing, renewal, substitute, reissue, or other applications for patents of any country, that may be deemed necessary by said corporation fully to secure to said corporation, its interest as aforesaid in and to said invention or any part thereof, and in and to said several patents or any of them;

AND I do hereby covenant for myself and my legal representatives and agree with said corporation, its successors and assigns, that I have granted no right or license to make, use or sell said invention to anyone except said corporation, that, prior to the execution of this deed, my right, title and interest in said invention had not been otherwise encumbered, and that I have not executed and will not execute any instrument in conflict herewith.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal:


James A. Salomon

10/11/00
Date

ACKNOWLEDGMENT

State of Connecticut)
County of Fairfield) ss. Shelton
)

On this 11 day of October, 2000, personally appeared before me the above-named James A. Salomon to me known and known by me to be the person described in and who executed the foregoing instrument, and subscribed the same in my presence, and acknowledged the same to be his free act and deed in and for the purposes set forth in said instrument.


NOTARY PUBLIC

Esther A. Lapin
Notary Public
My Commission Expires: 1-31-2002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re patent application of:) Attorney Docket No.: F-152

James A. Salomon) Group Art Unit:

Serial No.:) Examiner:

Filed: Concurrently herewith) Date: October 12, 2000

Title: **METHOD AND SYSTEM FOR PRODUCING ROBUST INDICIA FOR
DIGITAL PRINTING AND VERIFICATION**

CERTIFICATE OF MAILING BY EXPRESS MAIL

Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

In accordance with the provisions of 37 CFR 1.10, I hereby certify that the attached Patent Application consisting of 13 pages and 4 sheets of drawings; Transmittal Letter (original and one copy); Return Receipt Postcard; Declaration and Power of Attorney; and Recordation of Assignment with attached copy of executed Assignment were deposited on October 12, 2000, with the U.S. Postal Service for delivery by Express Mail. The number of the Express Mail mailing label is U.S. Express Mail EK 731069855US.

Respectfully submitted,



Ronald Reichman
Reg. No. 26,796
Attorney of Record
Telephone (203) 924-3854

PITNEY BOWES INC.
Intellectual Property and
Technology Law Department
35 Waterview Drive
P.O. Box 3000
Shelton, CT 06484-8000

METHOD AND SYSTEM FOR PRODUCING ROBUST INDICIA FOR DIGITAL PRINTING AND VERIFICATION

Technical Field

The present invention relates generally to a digital meter and, more specifically, to the affixing of a postage indicia on a mailpiece.

Background of the Invention

Currently, one can mail a letter or a package through the U.S. Postal Service (hereafter referred to as USPS) using a postage indicium. In using a postage indicium, the sender usually uses a postage meter certified by the USPS (or the government postal service for other countries) to issue a postage indicium according to the weight of the mailpiece, the destination, and the chosen service. The meter will print on the indicium the paid postage amount, the indicium issuance date, location, the meter number, and a postal service symbol. The indicium also carries encryption information, which includes the postage amount and other postal data that relate to the mailpiece and the postage meter that prints the indicium. The encrypted information, which is usually referred to as a digital token or a digital signature, is used for authentication purposes. The encryption is also used to protect the integrity of information, including the postage amount, imprinted on the mailpiece for later verification of postage payment. Since the digital token incorporates encrypted information relating to evidencing of postage payment, altering the printed information in an indicium is detectable by standard verification procedures. Examples of systems that are capable of generating and printing such indicia are described in U.S. Patent Numbers 4,725,718, 4,757,537, 4,775,246 and 4,873,645, each assigned to the assignee of the present invention.

It is preferable to include in the indicium a plurality of alphanumerical characters, which can be read by an Optical Character Recognition (OCR) device and by an operator. The use of such OCR characters on an indicium has the combined advantage of human readability and machine readability. Currently, postage indicia and OCR characters can be printed by the sender using an inkjet printer, a thermal transfer print head or another personal printer. The print head of an inkjet printer typically has one or more rows of nozzles to simultaneously push out a plurality of ink droplets to form a corresponding number of rows of pixels. Under normal circumstances, when the velocity of the mailpiece relative to the print head is constant, the print head can produce row after row of pixels on the mailpiece in a rectangular matrix formation, with each row being substantially perpendicular to the traveling direction of the mailpiece, and the pitch between pixel rows also being constant. If the velocity of the mailpiece is not constant, the pitch between the pixel rows may vary. Under unusual circumstances, the pixel rows may be caused to become skewed in one direction or another. Consequently, the image produced by the printer may become distorted. For example, a vertical line may become angled, and a rectangle may be printed as a non-orthogonal quadrilateral.

An OCR reader usually uses a linear optical scanning device to scan in the printed image. An OCR engine uses some sort of pattern matching algorithm to interpret the scanned-in image. If the OCR character region in an indicium is distorted when it is printed or when it is captured by the OCR reader, there is a possibility that the characters in that region may not be interpreted correctly. It is, therefore, desirable and advantageous to provide a method for improving the capture of an OCR character and/or other symbology region in an indicium on a mailpiece, so that the distortion in the OCR character and/or other symbology region can be detected to ensure that the symbols or OCR characters, as scanned in by optical scanner, are interpreted correctly.

Summary of the Invention

It is the primary objective of the present invention to reduce the errors in interpreting OCR characters in an OCR character and/or other symbology region of a postage indicium applied on a mailpiece, wherein the symbology or OCR character region may be caused to exhibit a defect associated with the production of the postage indicium or with the reading of the postage indicium. Accordingly, the first aspect of the present invention is to provide a method for improving the capture of the symbology or OCR character region. The method includes the steps of providing one or more error compensation marks in the proximity of the symbology or OCR character region such that the error compensation marks are caused to exhibit changes indicative of the defect of the symbology or OCR character region and detecting the changes in the error compensation marks in order to compensate for the defect of the symbology or OCR character region.

Preferably, the error compensation marks include a plurality of timing marks in order to identify the defect of the symbology or OCR character region caused by irregularities in the transport of the mailpiece through the indicium printing device, relative to the timing signal used by the printing device.

When a postage indicium is printed with a print head, it is preferable that the error compensation marks include a plurality of graphical images in order to identify the defect of the symbology or OCR character region caused by irregularities in the print head. These irregularities include misdirected jets, loss of jets, and so forth.

The second aspect of the present invention is to provide a system for improving the capture of a symbology or OCR character region in a postage indicium on a mailpiece, wherein the symbology or OCR character region includes symbols or OCR characters which may be caused to exhibit a defect associated with the production of the postage indicium or the reading of the postage indicium. The system includes:

a first mechanism, responsive to the mailpiece, for generating and providing one or more error compensation marks in the proximity of the symbology or OCR region, wherein the error compensation marks can be caused to exhibit changes indicative of the defect in the symbology or OCR region;

a second mechanism for reading the error compensation marks and producing data indicative of the error compensation marks;

a third mechanism, responsive to the data, for detecting the changes in the error compensation marks and for providing a signal indicative of the changes; and

a fourth mechanism, responsive to the signal, for compensating for the defect in the symbology, according to the detected changes in the error compensation marks.

Preferably, the second mechanism includes an optical scanner, and the data includes a scanned image.

Preferably, the fourth mechanism includes an OCR reader, operatively connected to the optical scanner, for recognizing the OCR characters.

Preferably, the OCR reader is also operatively connected to the third mechanism for compensating for the defect in the OCR characters, according to the detected changes in the error compensation marks.

Preferably, a fixed set of graphical information is used to compare with a scanned image so that errors due to printing and scanning can be corrected in an image processing algorithm. The additional graphical data is relatively small compared to the data content. The additional graphical data can be incorporated into indicia artwork, such as the borders and logos used in typical metering systems. Thus, the additional data does not incur large penalties in ink usage or print head life. The image processing algorithm for error correction is configured to process images in parallel to standard OCR read algorithms. If needed, the processed image can be substituted for parts of the image which are otherwise not readable.

The present invention will become apparent upon reading the description taken in conjunction with Figures 1 to 5.

Brief Description of the Drawings

Figure 1 is a diagrammatic representation illustrating a mailpiece having printed thereon an indicium, a destination address and a plurality of error compensation marks.

Figure 2 is a diagrammatic representation illustrating an OCR character region and the error compensation marks in the proximity of the OCR character region.

Figure 3 is a diagrammatic representation illustrating a defect on part of the OCR character region.

Figure 4a is a diagrammatic representation illustrating a plurality of timing marks near an OCR character region.

Figures 4b-4d are diagrammatic representations illustrating different defects on part of the OCR character region and the nearby timing marks.

Figure 5 is a diagrammatic representation illustrating a system for identifying the defect in an OCR character region and for compensating for the defect.

Detailed Description

Figure 1 illustrates a mailpiece 10 having a destination address 12 and an indicium 14 printed thereon. It should be noted that the indicium 14 shown in Figure 1 includes an OCR character region 16 (see Figure 2). The OCR character region 16 advantageously provides alphanumerical characters which can be read by an OCR reader. However, if the OCR characters are distorted or damaged when they are produced or when they are read in by an OCR reader, they may be interpreted incorrectly by the OCR reader. Thus, it is preferable to place a plurality of error compensation marks 40, 50, 60 and 70 in the proximity of the OCR character region 16 to detect the defects on the indicium 14, especially in the OCR character region 16. Furthermore, it is also possible to provide additional error compensation marks 80 and

82 in the proximity of the destination address 12 to help ensure that the destination address 12 is read correctly by a device.

As shown in Figure 2, the error compensation marks 40 and 50 include a plurality of graphic elements especially designed to detect the defects caused by the inkjet nozzles of an inkjet printer print-head (not shown). In particular, the error compensation mark 40 includes a group of ladder images 42, 44 and 46 to be associated, respectively, with the character rows 22, 24 and 26 in the OCR character region 16. Additionally, the error compensation mark 60 includes two rows of timing marks 62 and 64, while the error compensation mark 70 includes two rows of timing marks 72 and 74. The timing marks are designed to detect the defects caused mainly by the irregularities in the transport of the mailpiece through the inkjet printer. It should be noted that the characters within the OCR character region 16 in an indicium 14 may vary from one mailpiece to another, and there are many different types of defects or distortions that may appear on an OCR character. Thus, it is difficult to design an algorithm to detect the differences between a character in its normal form and the same character in one of the many distorted forms. For example, each of the OCR characters in the character row 26' contains some defects, as shown in Figure 3. While the defective characters may be easily recognizable by an operator, they may be interpreted incorrectly by a machine. In contrast, error compensation marks can be made of fixed patterns printed at fixed locations so that any changes in the patterns can be easily detected. For example, one could simply store the fixed patterns in a database, and use these stored patterns as templates for comparison with the scanned-in patterns. As shown in Figure 3, the ladder image 46' has two blank strips 48 and 49. When the ladder image 46' and a normal ladder image 46 are compared, it can be recognized that the problem is missing ink droplets, probably caused by a blockage in the inkjet nozzles. Accordingly, the defective characters in the character row 26' can be recognized by an error detection and correction algorithm (see Figure 5).

Defects in the OCR character regions due to irregularities in the mailpiece transport through a printer and other similar causes can be identified by the use of timing marks. Figures 4a-4b illustrate some of the defects that are identifiable by timing marks. For illustrative purposes, Figure 4a shows an OCR character region 16 under normal printing conditions, which is substantially rectangular in shape with a plurality of evenly spaced vertical lines 18. As shown, two rows of timing marks 62 and 64 are provided above the OCR character region 16 and two rows of timing marks 72 and 74 are provided below the OCR character region 16. Under normal printing conditions, the timing marks in each row are evenly spaced, as shown in Figure 4a. Also, all the corresponding timing marks in rows 62, 64, 72 and 74 are substantially aligned with each other in the vertical direction.

If the nozzle rows in an inkjet printer are not perpendicular to the transport direction of the mailpiece, either by design or transport misalignment, a skewed image may result. As shown in Figure 4b, a normally rectangular OCR character region would look like a parallelogram, as denoted by numeral 16'. Accordingly, the lines within the OCR character region 16' may become slanted, as denoted by numeral 18'. Thus, the printer problem that distorts the OCR character region 16' also causes the timing marks to appear differently. As shown in Figure 4b, the corresponding timing marks in rows 62, 64, 72 and 74 are no longer aligned vertically, as denoted by numerals 62', 64', 72' and 74'. This misalignment can be detected by using an optical scanner having a linear row of optical sensors to scan in the timing marks, wherein the orientation of the optical sensor row is perpendicular to the transport direction of the mailpiece when the timing marks are read.

If the plane surface of a mailpiece is not even, such as when a corner of the mailpiece is curved upward, the OCR character region may be distorted in a different way. As shown in Figure 4c, one of the upper corners of the OCR character region may appear squeezed inward. While most of the vertical lines 18" in the OCR character

region 16" appear to be normal, a few right-most lines are tilted to the left. This type of distortion would also appear on the timing marks 62", 64", 72" and 74".

If the mailpiece transport mechanism in the printer behaves erratically such that the transport velocity of the mailpiece relative to the inkjet printing speed is non-uniform, this will cause yet another different type of defect in the OCR character region. As shown in Figure 4d, while the entire OCR character region 16"" appears to be normal as it retains a rectangular shape, the vertical lines 18"" within the OCR character region 16"" are no longer evenly spaced. This type of defect in the OCR character region 16"" also appears in the timing marks 62"", 64"", 72"" and 74"".

Figures 2 through 4d demonstrate that it is possible to provide a plurality of error compensation marks in the proximity of an OCR character region for distortion detection. These error compensation marks are caused to exhibit changes indicative of the defect of the OCR character region. Once the changes in the error compensation marks are detected, the defect of the OCR character region can be compensated for.

It should be noted that the method, according to the present invention, is used to detect the defect in the OCR character region, but it is not intended to correct the defect on the mailpiece itself. The defect is compensated for only in the interpretation of the scanned-in image by an OCR reader. Thus, the first aspect of the present invention is to detect the defect in the OCR character region of a postage indicium and to help ensure that the OCR characters are interpreted correctly.

The second aspect of the present invention is to provide a system 110 for improving the capture of an OCR region 16 in a postage indicium 14 on a mailpiece 10 (see Figure 1), wherein the OCR character region 16 includes a plurality of OCR characters which may exhibit defects associated with the production of the postage indicium or the reading of the postage indicium. As shown in Figure 5, the system 110 includes a printer 120, which is operatively connected to a mechanism 122 capable of causing the printer 120 to print a plurality of error compensation marks 40, 50, 60, 70, 80 and 82 in the proximity of the OCR character region 16 on the mailpiece 10. The

error compensation marks 40, 50, 60, and 70 can be caused to exhibit changes indicative of the defects in the OCR character region 16. Optionally, error compensation marks 80 and 82 are provided in the proximity of the destination address 12 on the mailpiece 10 (Figure 1). Likewise, the error compensation marks 80 and 82 can be caused to exhibit changes indicative of the defects in the destination address 12. The system 110 further comprises an optical scanner 130 to scan in the OCR characters in the OCR character or other symbology region 14 (and optionally the destination address 12) along with the error compensation marks 40, 50, 60, 70, 80 and 82. The scanned image obtained by the optical scanner 130 is denoted by reference numeral 132. The optical scanner 130 is operatively connected to an OCR device 136, which recognizes the OCR characters based on the scanned image 132. The optical scanner is further connected to a mechanism 140 for detecting the changes in the error compensation marks, based on the scanned image 132, in order to compensate for the defect of the OCR characters and other symbology in the scanned symbology region 14, according to the detected changes in the error compensation marks. Preferably, the mechanism 140 uses an image processing algorithm 142 to compare the scanned image 132 with a fixed set of graphical information 144 in order to detect the changes in the error compensation marks 40, 50, 60, 70, 80 and 82. Furthermore, the mechanism 140 provides a signal 150 to the OCR device 136 so as to allow the OCR device 136 to recognize OCR characters which may be distorted or affected by the defects. For example, the mechanism 140 may provide a signal indicating the missing inkjets as shown in Figure 3.

Although the invention has been described with respect to a preferred embodiment thereof, it will be understood by those skilled in the art that the foregoing and various other changes, omissions and deviations in the form and detail thereof may be made without departing from the spirit and scope of this invention.

What is claimed is:

1. A method for improving capture of a symbology region in a postage indicium applied on a mailpiece, wherein the symbology region may be caused to exhibit a defect associated with the production and/or scanning of the postage indicium, said method comprising the steps of:
 - (a) providing one or more error compensation marks in the proximity of the symbology region such that the error compensation marks are caused to exhibit changes indicative of the defect of the symbology region, and
 - (b) detecting the changes in the error compensation marks in order to compensate for the defect of the symbology region.
2. The method of claim 1, wherein the symbology region includes an OCR character region.
3. The method of claim 2, wherein the error compensation marks include a plurality of timing marks for identifying the defect of the OCR character region caused by irregularities in transport of the mailpiece through the indicium printing device.
4. The method of claim 3, wherein the irregularities are the result of a mismatch between transport velocity for transporting the mailpiece and timing signals of the printing device.
5. The method of claim 3, wherein the print device includes a print head having a plurality of inkjet nozzles, and wherein the irregularities are the result of a misalignment of the transport mechanism with the print head, causing the inkjet nozzles to appear skewed relative to a transport direction of the transport mechanism.

6. The method of claim 3, wherein the irregularities are the result of an uneven surface section of the mailpiece.

7. The method of claim 2, wherein the error compensation marks include at least one graphic image for identifying the defect of the OCR character region caused by irregularities in the postage indicium producing device.

8. The method of claim 1, wherein the postage indicium producing device is an inkjet printer having at least one row of inkjet nozzles to apply ink droplets onto the mailpiece, wherein the irregularities in the indicium producing device are related to missing ink droplets applied by the inkjet nozzles.

9. The method of claim 1, wherein the postage indicium producing device is an inkjet printer having a plurality of inkjet nozzles to apply ink droplets onto the mailpiece, wherein the irregularities in the indicium producing device are related to blockage of one or more inkjet nozzles.

10. A system for improving capture of a symbology region in a postage indicium applied on a mailpiece, wherein the symbology region includes symbols which may be caused to exhibit a defect associated with the production and/or scanning of the postage indicium, said system comprising:

- (a) a first mechanism, responsive to the mailpiece, for generating and providing one or more error compensation marks in the proximity of the symbology region, wherein the error compensate marks can be caused to exhibit changes indicative of the defect in the symbology region;
- (b) a second mechanism for reading the error compensation marks and producing data indicative of the error compensation marks;

- (c) a third mechanism, responsive to the data, for detecting the changes in the error compensation marks and for providing a signal indicative of the changes; and
- (d) a fourth mechanism, responsive to the signal, for compensating for the defect in the symbology, according to the detected changes in the error compensation marks.

11. The system of claim 10, wherein the symbology region includes an OCR character region and the symbols include OCR characters.

12. The system of claim 11, wherein the second mechanism includes an optical scanner and the data includes a scanned image.

13. The system of claim 12, wherein the third mechanism includes an image processing algorithm to compare the scanned image with a fixed set of graphical information in order to detect changes in the error compensation marks.

14. The system of claim 12, further comprising an OCR reader, operatively connected to the optical scanner, for recognizing the OCR characters.

15. The system of claim 14, wherein the OCR reader is operatively connected to the third mechanism to compensate for the defect in the OCR characters, according to the detected changes in the error compensation marks.

METHOD AND SYSTEM FOR PRODUCING ROBUST INDICIA FOR DIGITAL PRINTING AND VERIFICATION

Abstract of the Disclosure

A method and system for improving the capture of an OCR character region of a postage indicium, wherein the OCR character region may exhibit a defect associated with the production or the reading of the indicium. A plurality of error compensation marks is provided in the proximity of the OCR character region such that the error compensation marks are caused to exhibit one or more changes indicative of the defect of the OCR character region. Thus, the defect in the OCR character region can be identified by detecting the changes in the error compensation marks. Accordingly, the defect in the OCR character region can be compensated for when the OCR characters are interpreted.

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1 of 4

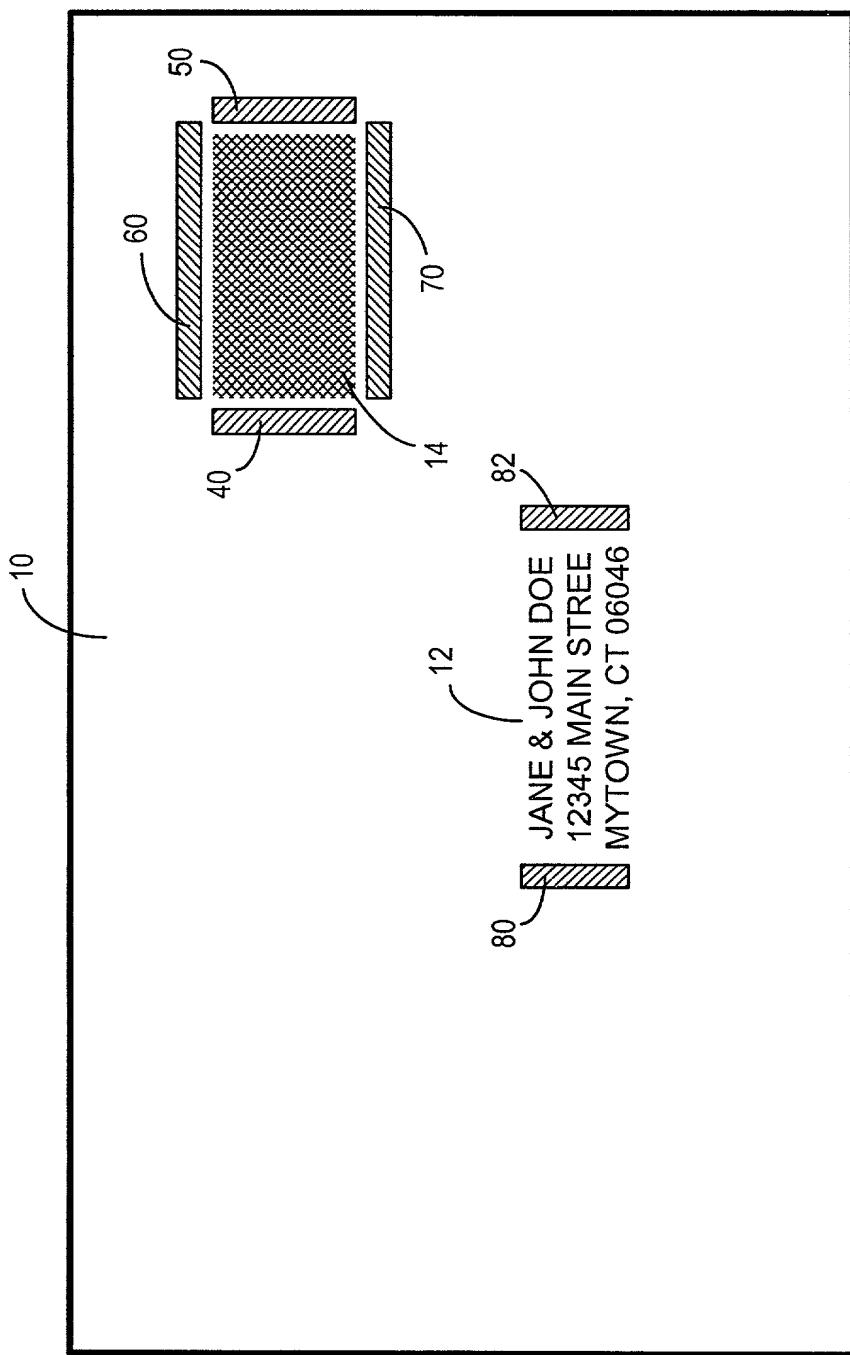


FIG. 1

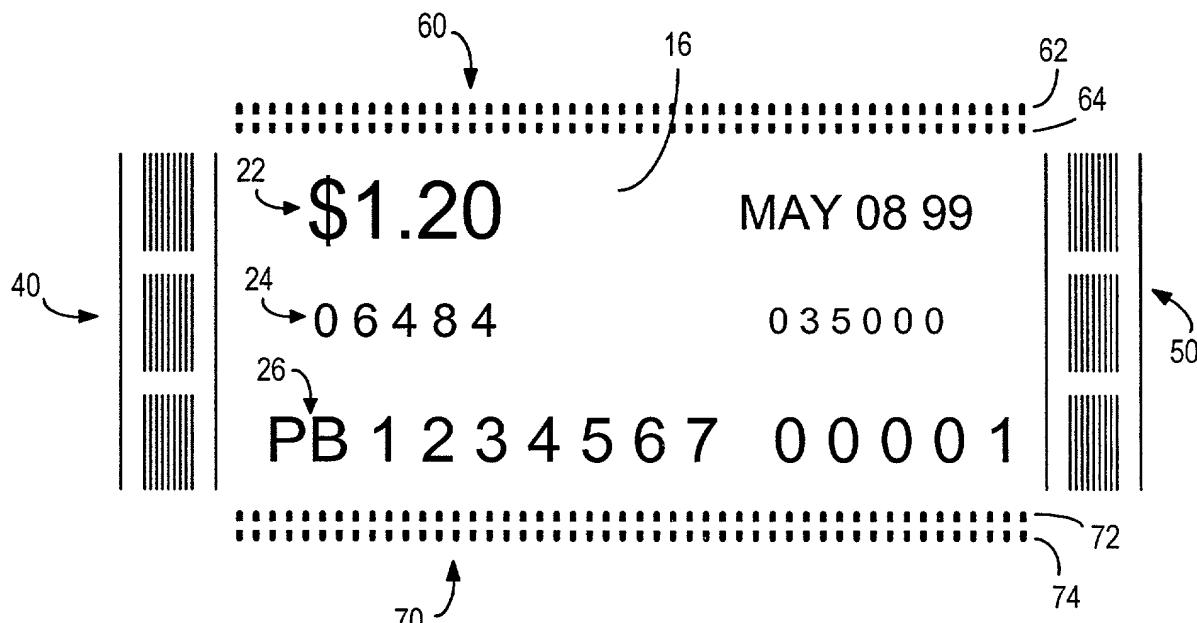


FIG. 2

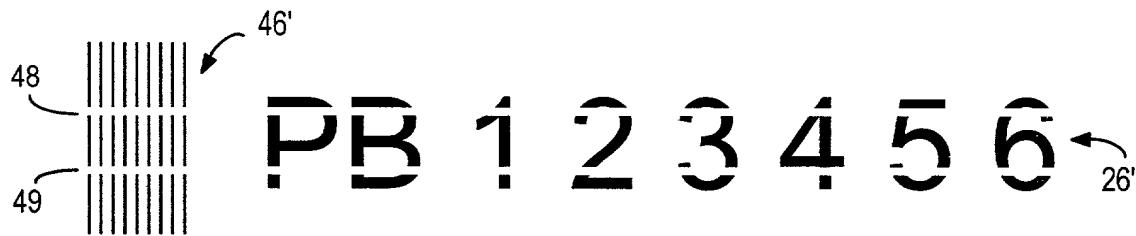


FIG. 3

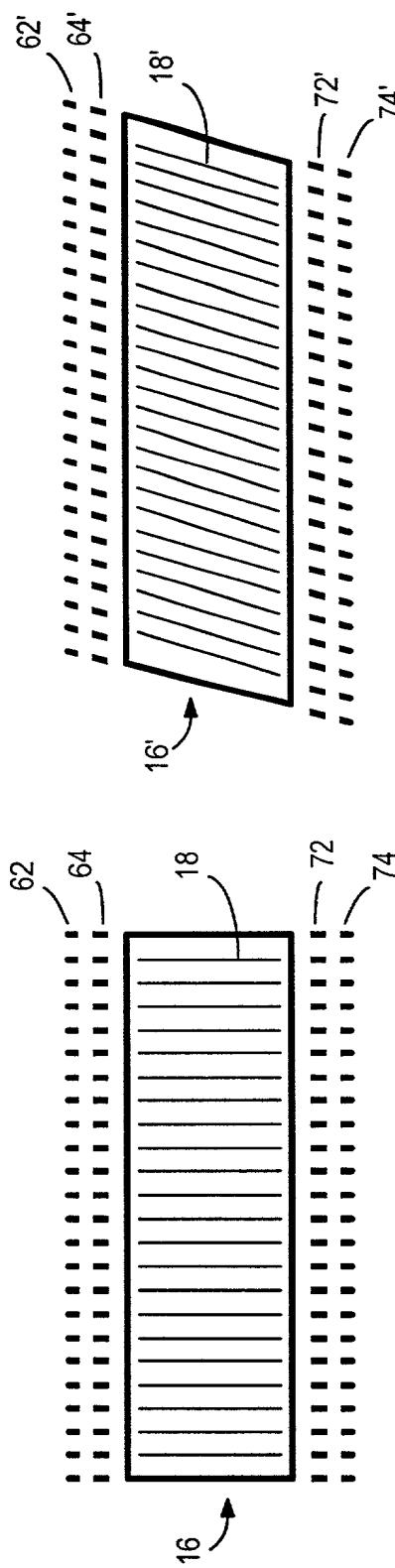


FIG. 4b

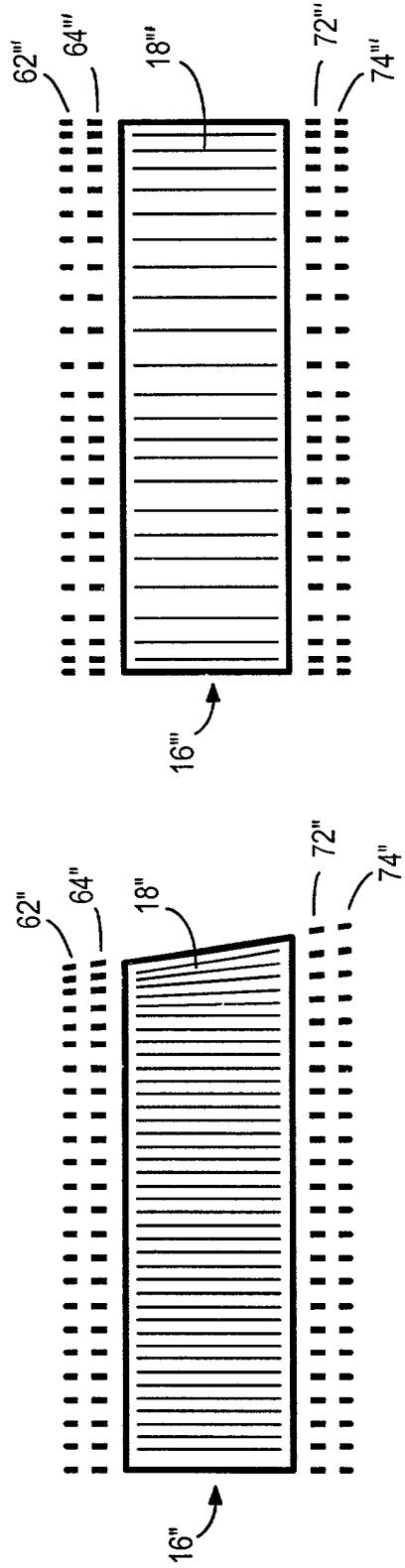
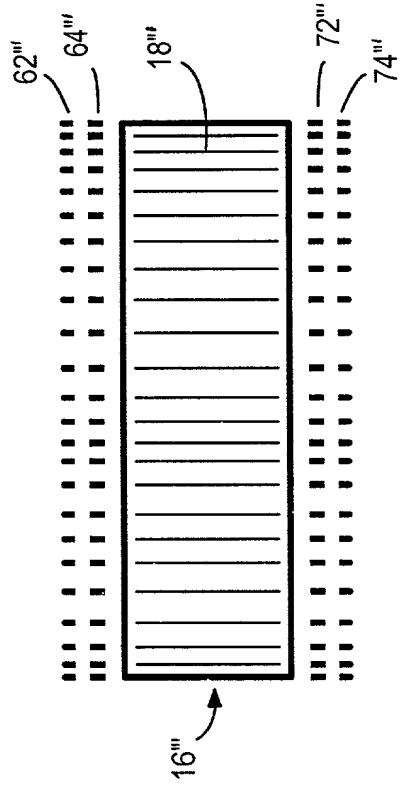


FIG. 4d



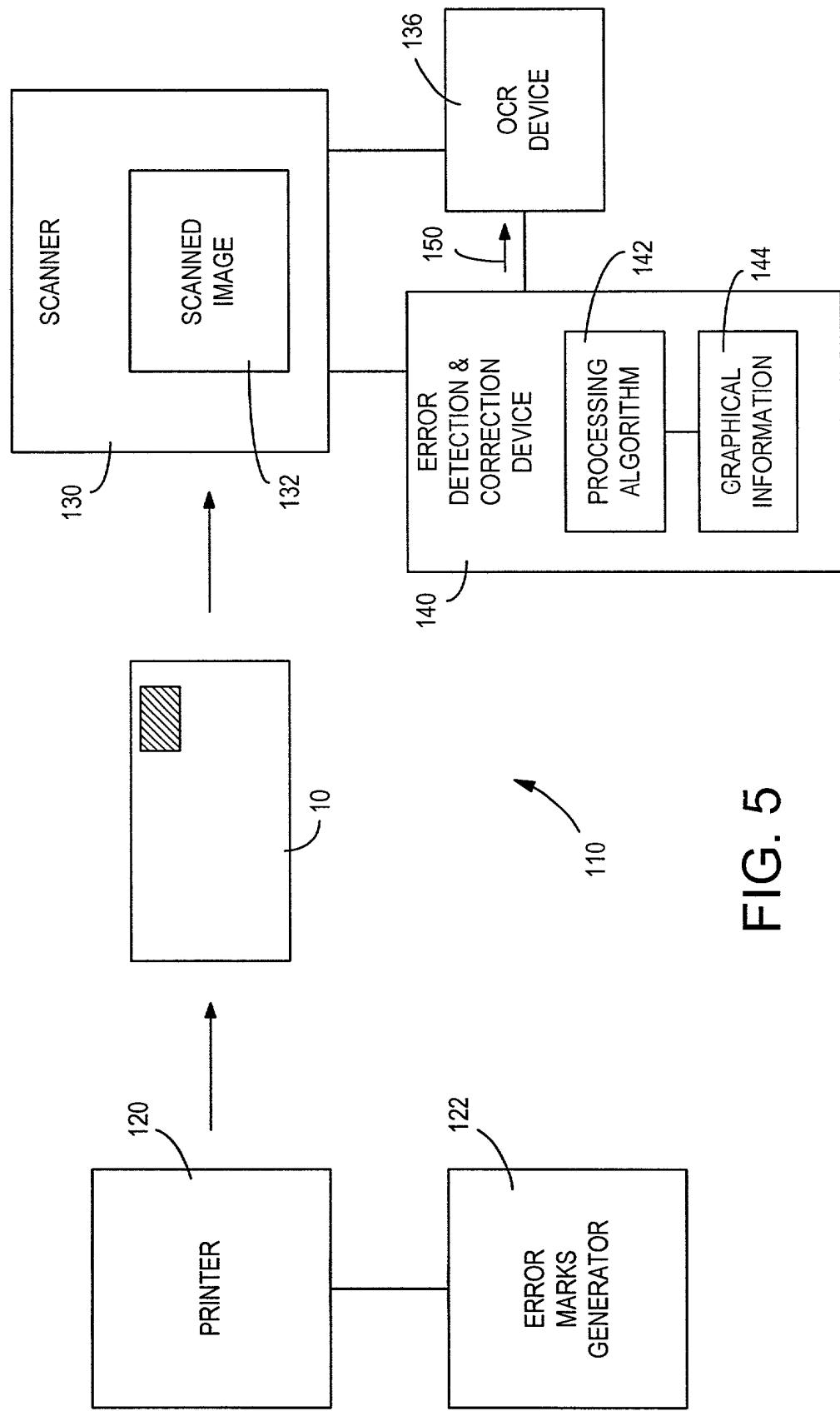


FIG. 5

DECLARATION AND POWER OF ATTORNEY Patent Application	Attorney's Docket Number F-152 Page 1 of 2
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As below named inventor, I hereby declare that:

my residence, post office address and citizenship are as stated below next to my name;

I believe that I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled

**METHOD AND SYSTEM FOR PRODUCING ROBUST INDICIA FOR DIGITAL PRINTING
AND VERIFICATION**

described and claimed in the attached specification;

I have reviewed and understand the contents of the above-identified specification, including the claims;

I acknowledge my duty to disclose to the Patent and Trademark Office all information known to me to be material to the patentability of this application as defined in Title 37, Code of Federal Regulations, section 1.56; and

I do not know and do not believe the invention was ever known or used in the United States of America before my invention thereof, or patented or described in any printed publication in any country before my invention thereof or more than one year prior to this application, that the invention was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns.

I hereby appoint the following attorneys and/or agents to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith;

Ronald Reichman
Michael E. Melton
David E. Pitchenik
Robert E. Meyer

Reg. No. 26,796
Reg. No. 32,276
Reg. No. 24,020
Reg. No. 26,307

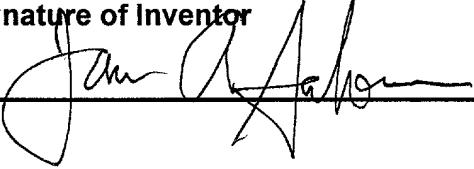
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Address all telephone calls to **Ronald Reichman** *RR 10/11/00*
at telephone No.: (203) 924-3854

Address all correspondence to:

Ronald Reichman *RR 10/11/00*
Pitney Bowes Inc.
Intellectual Property and
Technology Law Department
35 Waterview Drive
P.O. Box 3000
Shelton, CT 06484

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name	Last Salomon	First James	Middle A.
Residence & Citizenship	City Cheshire		State CT Citizenship USA
Post Office Address	Street Address 43 Far Horizon Drive	City Cheshire	State CT Zip Code 06410
Signature of Inventor 			Date <i>10/11/00</i>